HP BIOS Serial Console User Guide

July 2004 (First Edition)
Part Number 372432-001

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Audience Assumptions

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

Console Redirection Overview

In This Section

Purpose

The purpose of console redirection is to provide the capability to remotely manage a server in a headless environment. Through BIOS Serial Console redirection, you can see POST messages, navigate option ROM (such as ORCA) setup menus, and use RBSU through a serial connection to the server COM port. The local keyboard and monitor are no longer required to set up or configure the system. The remote server setup and configuration can also be performed remotely through the terminal server, iLO Management Processor, or RILOE board. Some OSs support console redirection as well.

IMPORTANT: For documentation purposes, the **local** server refers to the one that you are remotely configuring. Though this local server does not require a keyboard and monitor, you will need a keyboard and monitor on the system you are using to enter BIOS Serial Console commands.

NOTE: This document is designed to provide information for BIOS Serial Console on any compatible server. It is generic in nature and therefore may contain options that are not valid on all servers.

Introduction

Two separate technologies enable console redirection. The first, BIOS Serial Console, is the focus of this document and can be enabled in the ROM. The other is console redirection through the OS, such as EMS support, and requires OS support and ROM support.

BIOS Serial Console Overview

BIOS Serial Console can be enabled in RBSU. By default, BIOS Serial Console is disabled.

EMS Support Overview

EMS support is a Microsoft® feature for the Windows® Server 2003 OS, which is enabled by default in the OS, but which also must be enabled in the system ROM. By default, EMS support is disabled for ML and DL servers, and is enabled for BL servers.

Refer to "Operating System Support (on page 17)" for more information about using supported OSs.

Initialization

BIOS Serial Console initialization occurs during power-up or system reset, before the first message is displayed on the screen.

Connectivity

A null modem cable should be connected to one of the serial ports on the server for console redirection. Be sure to connect the cable to the serial port that corresponds to the correct COM port on which BIOS Serial Console is enabled. The default COM port is COM 1 for systems with BIOS Serial Console enabled by default. This setup can be configured in RBSU.

Refer to "RBSU and BIOS Serial Console Configuration (on page 9)" for COM port settings.

Console Redirection Features

The following console redirection features are discussed in further detail in "HP BIOS Serial Console/EMS Support Settings and Configuration (on page 9)":

HP BIOS Serial Console/EMS Support Settings and Configuration

In This Section

RBSU and BIOS Serial Console Configuration

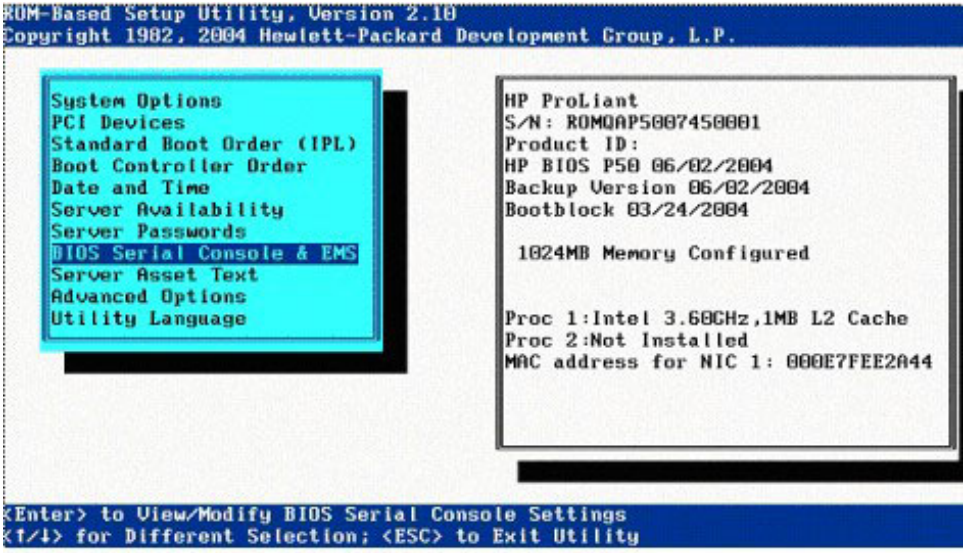
BIOS Serial Console supports console redirection of POST error messages and configuration utilities and is disabled in the ROM by default. EMS support is enabled in the OS by default, but also requires system ROM support. This section takes you through RBSU configuration, basic OS initialization, and terminal emulation for console redirection.

> **NOTE:** On some newer servers, the BIOS Serial Console default will be AUTO instead of disabled. During the boot process, the server will check for the presence of a VT100 compatible client running at 9600 Baud connected to the server and automatically will enable the BIOS Serial Console for that boot if one is found. This eliminates the need to run RBSU with a local keyboard and monitor attached to enable the BIOS Serial Console feature.

RBSU displays and modifies the system configuration settings of a server. The figures in this section show settings for BIOS Serial Console options on the RBSU menu. Except for the following figure, these screens are shown with ANSI emulation.

Press the **Enter** key while BIOS Serial Console is selected on the RBSU main menu to display the options.

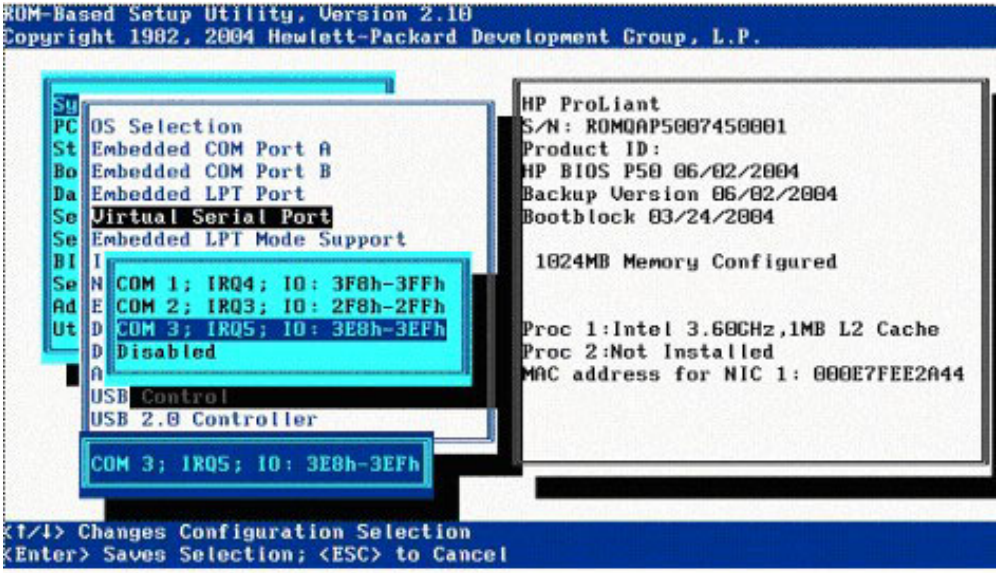
IMPORTANT: Settings take effect on the next RBSU-prompted reboot, but you must disconnect and then reconnect for new settings to take effect on both local and remote machines.



Virtual Serial Port

When enabled, Virtual Serial Port provides remote access through the iLO management controller to BIOS Serial Console.

For detailed information about iLO configurations, refer to the *HP Integrated Lights-Out User Guide* on the Documentation CD or to the HP website (http://www.hp.com/servers/lights-out).



Terminal Emulation Support

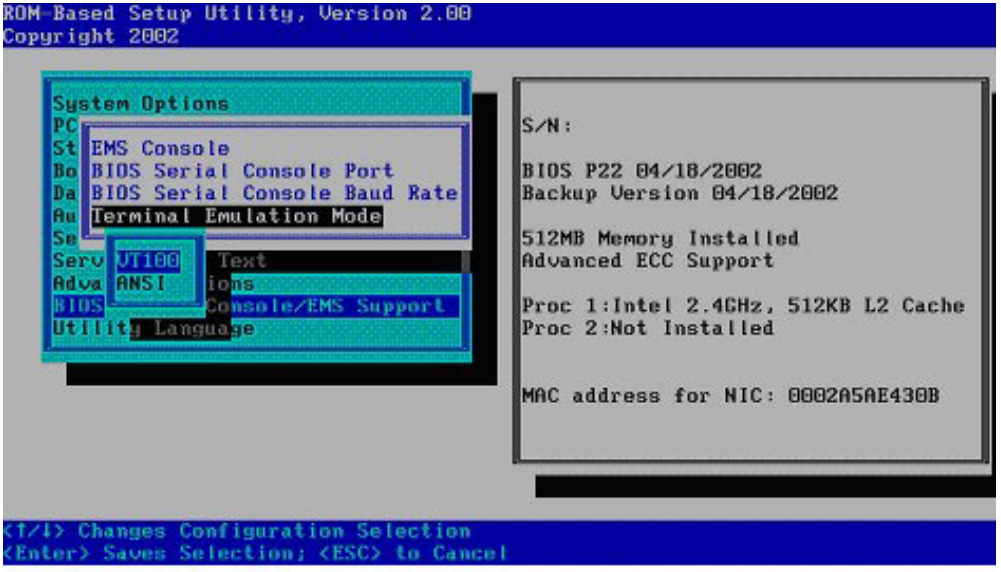
BIOS Serial Console supports ANSI and VT100 terminal emulation. Although the screens displayed in this guide show the ANSI console for clarity, VT100 is supported by all terminal emulation programs. It should be chosen if the terminal emulation program is running in VT100 mode. BIOS Serial Console will support a CLI for RBSU and other embedded ROM utilities on select new servers for faster, more compatible display with VT100 and compatible terminals. On these newer servers, BIOS Serial Console support will default to Enabled/VT100/9600 Baud for maximum compatibility with VT100 users. ANSI emulation and the menu-based RBSU interface may not be supported when BIOS Serial Console is enabled or in use due to limited compatibility with VT100. The menu-based RBSU interface will continue to be supported automatically in modes in which BIOS Serial Console is disabled or not in use. Refer to the *HP ROM-Based Setup Utility User Guide*, available on the HP website (http://www.hp.com/servers/smartstart), for more information on CLI.

Press the **Enter** key while Terminal Emulation Mode is selected to display the emulation mode options. Select the option that matches the terminal emulation program being used.

BIOS Serial Console is designed to support most terminal emulation programs. No special version of a terminal emulation program is required, although the emulation modes supported may vary by vendors. To avoid compatibility problems, only the core set of VT100 and ANSI terminal emulation is used in BIOS Serial Console. Although this limits some capabilities, this protocol guarantees the maximum compatibility across different platforms and vendors.

> **NOTE:** On some newer servers, emulation will be limited to VT100 compatibility.

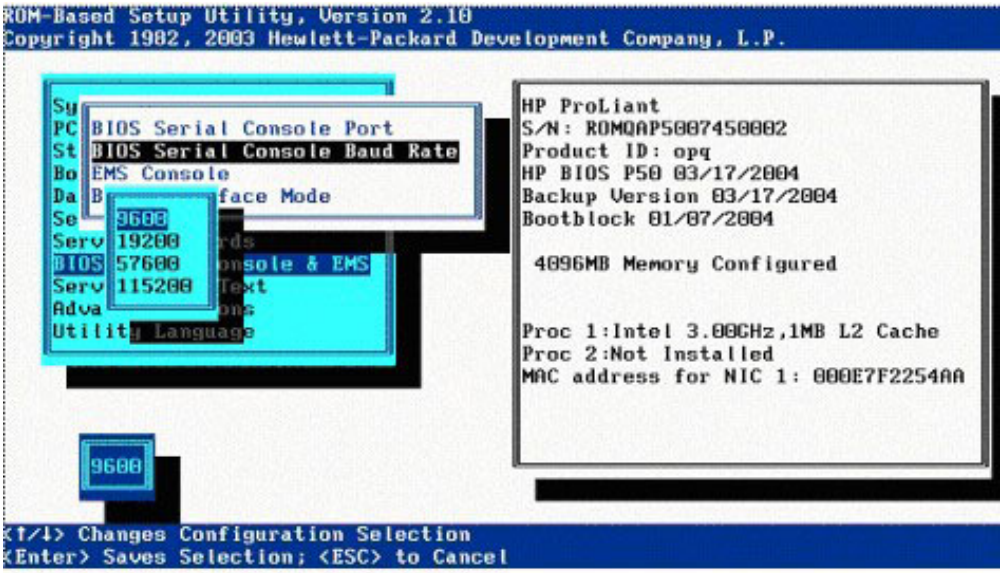
Default settings for terminal emulation and baud rate can be changed through the ProLiant BL e-Class Integrated Administrator for the current session only. Refer to the *HP ProLiant BL e-Class Integrated Administrator User Guide* for more information.



Some new servers, which use CLI and are configured using BIOS Serial Console, will display a command prompt screen.

Baud Rate

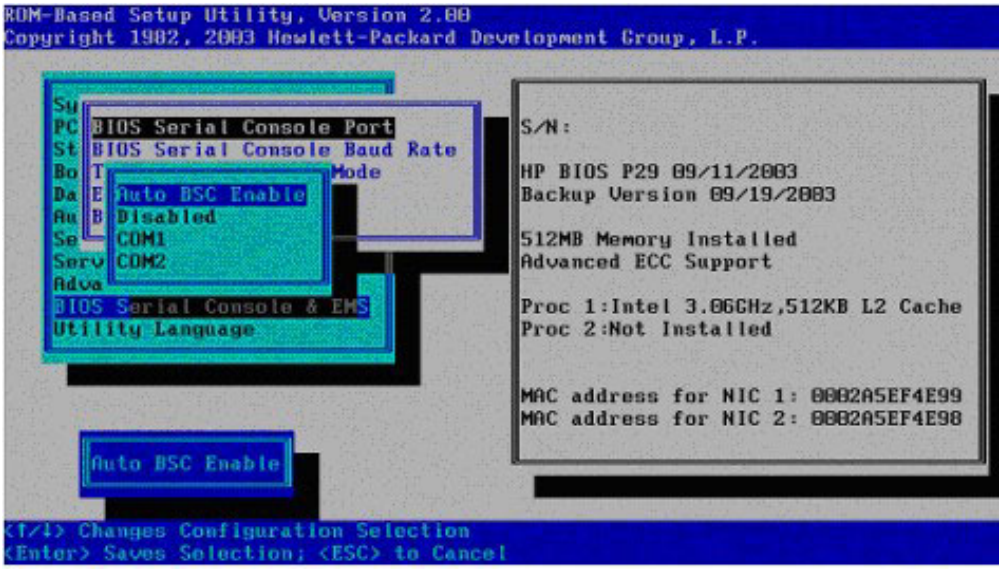
Press the **Enter** key while BIOS Serial Console Baud Rate is selected to display the baud rate. The default setting is 9600 when BIOS Serial Console is enabled by default. This setting can be configured in RBSU.



Port Settings

Press the **Enter** key while BIOS Serial Console Port is selected to display the port settings. When BIOS Serial Console is enabled by default, the default port setting is COM1. BIOS Serial Console is disabled by default. To enable port settings, select the COM port used for serial console redirection.

IMPORTANT: Enabling port settings enables console redirection only at POST commands and configuration utilities. For information on console redirection of the OS, refer to "Operating System Support (on page 17)."



NOTE: Systems with iLO require version 1.05 iLO firmware or greater to run BIOS Serial Console.

Keystroke Emulation

Because not all terminal emulation programs support function keys or special characters, certain keystroke sequences are required for some commands.

Escape Sequences

BIOS Serial Console enables you to manually input unsupported keystrokes by entering escape sequences. Each character must be entered within 2 seconds of pressing and holding down the **Esc** key to emulate the escape sequence.

NOTE: You must use escape sequences if the emulation program does not support function keys, but they also work if the emulation program does support function keys. Refer to the terminal emulation guide to be sure that you may use function keys.

Function Keys

Keyboard Entry	Defined As
<ESC>1	F1
<ESC>2	F2
<ESC>3	F3
<ESC>4	F4
<ESC>5	F5
<ESC>6	F6
<ESC>7	F7
<ESC>8	F8
<ESC>9	F9
<ESC>0	F10
<ESC>!	F11
<ESC>@	F12

Control Keys

Keyboard Entry	Defined As
<ESC>h	Home
<ESC>k	End
<ESC>+	Insert
<ESC>-	Delete
<ESC>?	Page Up
<ESC>/	Page Down

Reset Key

Keyboard Entry	Defined As
<ESC>R<ESC>r<ESC>R	System Reset

Character Translations in VT100 Mode

The VT100 protocol does not support special characters such as line draw characters. These characters are translated so that they can be displayed on the VT100 screen. Character translation is used for improved VT100 screen display and has no effect on functionality of BIOS Serial Console.

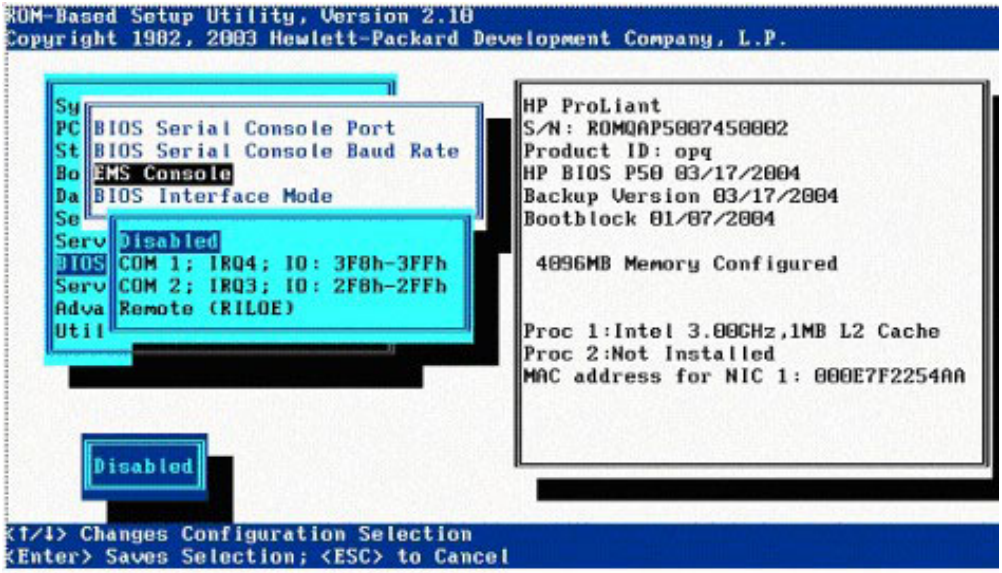
Currently, the special characters in the table are translated into VT100 characters using VT100 protocol.

Special Character	Translated Into
Line draw character upper left corner	+
Line draw character lower left corner	+
Line draw character upper right corner	+
Line draw character lower right corner	+
Line draw character horizontal line	-
Line draw character vertical line	|

Operating System Support

Some OSs offer console redirection within the OS. Microsoft® Windows® Server 2003 and Linux can be configured for console redirection.

When Enable Local is selected, the OS redirects through the local serial port. When Enable Remote is selected, the OS redirects through iLO or RILOE II. Data becomes available through the browser configured for iLO instead of through the serial port. Enabling remotely requires iLO 1.10 firmware or later.



NOTE: Currently, Microsoft® Windows® Server 2003, Linux, and FreeBSD are the only OSs with console redirection support. Linux and FreeBSD allow for generic Serial Console sessions, and Windows® Server 2003 includes EMS.

NOTE: The Japanese character set (multi-byte character set) does not display on BIOS Serial Console screens. Do not select Japanese as the language display.

Emergency Management Services

EMS support provides input/output support for all Microsoft® Windows® kernel components: the loader, setup, recovery console, OS kernel, blue screens, and the Special Administration Console. The Special Administration Console is a text mode management console available after Windows® Server 2003 OS has initialized. For more information on EMS support, go to the Microsoft® website (http://www.microsoft.com/hwdev/headless).

Microsoft® enables EMS support in the OS, but EMS support also requires ROM support. EMS support, when enabled, assumes the serial port for redirection and may cause interference with other devices attached to the serial port. To avoid interference, EMS is disabled in the system ROM by default on ML and DL servers. To enable this feature, Enable Local or Enable Remote must be selected under the BIOS Serial Console/EMS Support menu in RBSU before installing Windows® Server 2003. If you install Windows® Server 2003 with EMS disabled, and later decide to enable it, perform the following steps to update the boot.ini file:

1. Enable EMS in RBSU.
2. Run `bootcfg/ems on/id 1`.
3. Reboot.

Linux Red Hat 7 Serial Console Settings

If you are using an HP ProLiant BL e-Class server, each server blade maintains a connection to COM 1, so they are primarily used remotely through the Integrated Administrator. To enable BIOS Serial Console for Linux Red Hat 7 OS:

1. Remove the line:
   ```
   message=/boot/message from /etc/lilo.conf
   ```
2. Add the following line to the Linux image specification in /ect/lilo.conf:
   ```
   Append="console=tty0 console=ttyS0, 115200"
   ```
3. Run /sbin/lilo to make the changes take effect.
4. Add the following line to the end of /etc/inittab to enable agetty on COM1 (ttyS0):
   ```
   7:12345:respawn:/sbin/agetty 115200 ttyS0 vt100
   ```
5. Set `SAFE=yes` in the file /etc/sysconfig/kudzu, so it does not probe the serial port during initialization.
6. Add the following line to /etc/securetty to allow root to log in on the ttyS0:
   ```
   ttyS0
   ```
7. Reboot the server blade with these new settings.

Linux Red Hat 7 ATA Driver Settings

By default, Linux Red Hat 7.1 OS uses only the ATA driver in PIO mode for the server blades ATA controller. Use the following change to set the driver to use DMA and higher speeds (66 MHz/100 MHz):

1. Add `ide0=ata66` to the LILO append line described in step 2 in Linux Red Hat 7 Serial Console Settings (on page 19):

   ```
   Append="console=tty0 console=ttyS0, 115200
   ide0=ata66"
   ```

2. Run /sbin/lilo to make the changes take effect.

Linux Red Hat 7 NIC Driver Settings

By default, Linux Red Hat 7.1 OS uses the eepro100 driver. HP has tested the Intel® e100 driver and recommends changing to this driver. To change the default driver, change the lines `eepro100` in /etc/modules.conf to `e100`.

For example, networking lines in modules.conf are:

```
alias eth0 e100
alias eth1 e100
```

This change takes effect at the next reboot.

Linux Red Hat 7 Services Configuration

Change the runlevel configuration of the following services (if installed) since they are not needed on HP ProLiant BL e-Class server blades:

```
Chkconfig --level 0123456 apmd off
Chkconfig --level 0123456 gpm off
```

Terminal Emulation Programs

Console redirection is supported using many terminal emulation programs. Any terminal emulation program can be used with BIOS Serial Console and with OS console redirection.

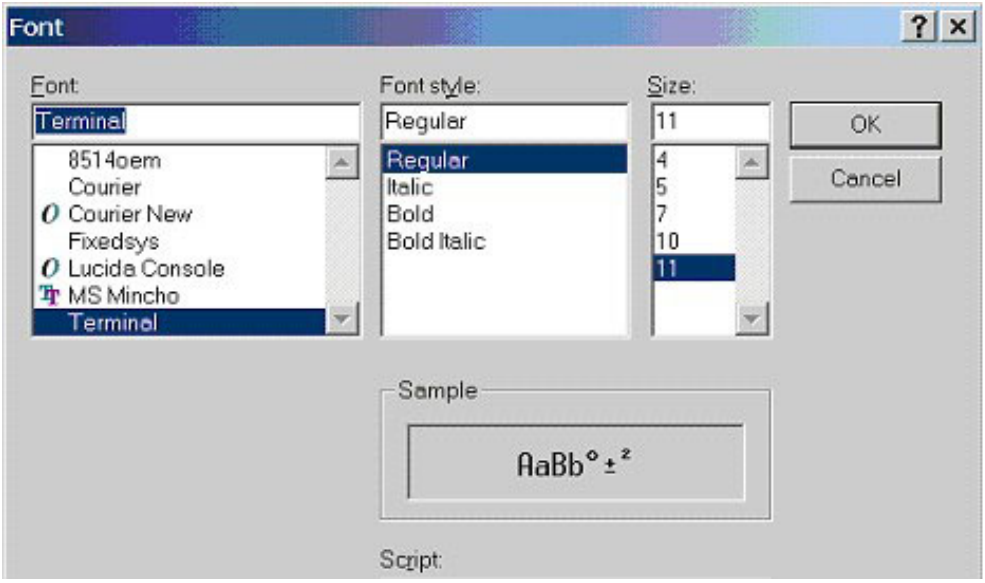
Microsoft HyperTerminal Setup

Because Microsoft® HyperTerminal is a widely used terminal emulation program, examples of HyperTerminal 6.3 setup screens follow to aid in the initialization process. Be sure that the remote terminal screen settings match the screens in this section. If using an emulation program other than HyperTerminal, refer to the software reference material for settings information.

NOTE: For information on additional settings through Microsoft® Windows Server 2003, go to the Microsoft® website (http://www.microsoft.com/hwdev/headless).

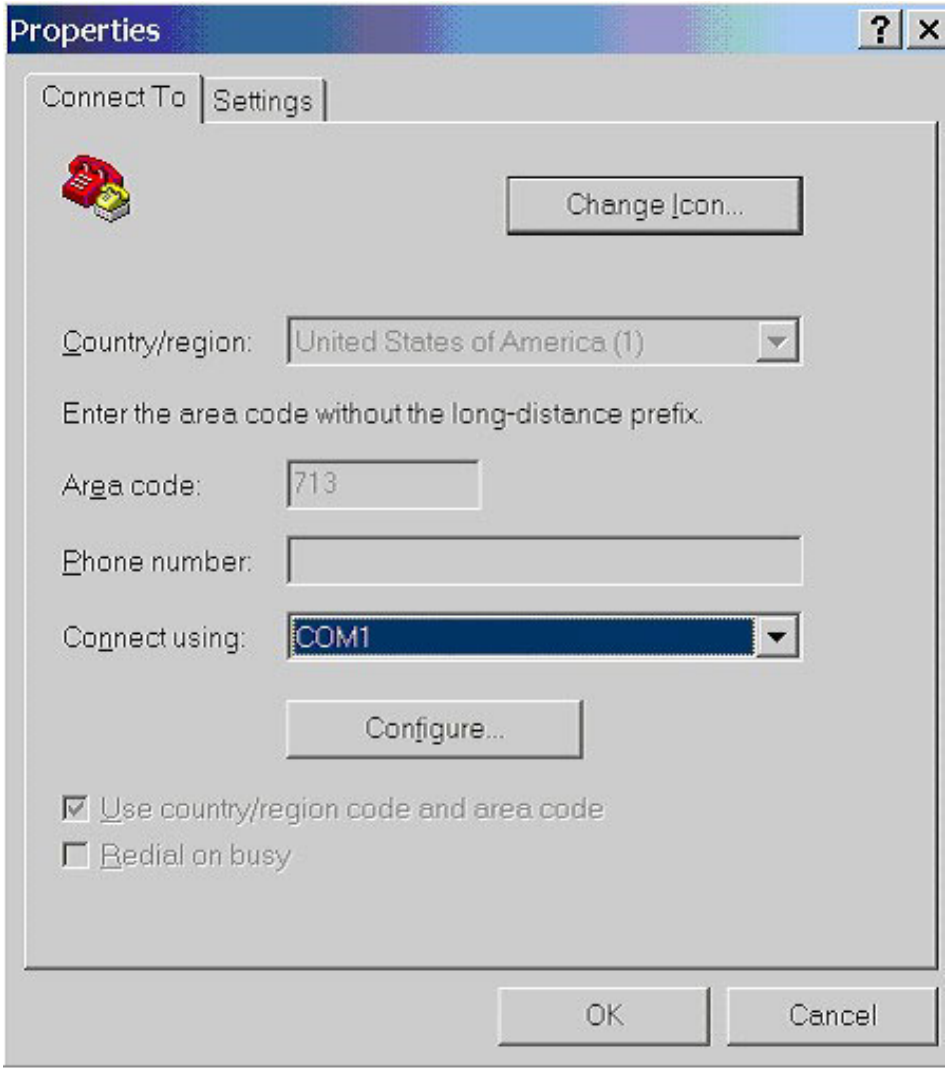
NOTE: Microsoft® HyperTerminal settings must match BIOS Serial Console settings. Access the OS terminal settings or RBSU to change the default settings.

1. To access the font screen, select the **View** menu from the HyperTerminal main screen, and then click **Font**. Select **Terminal**.



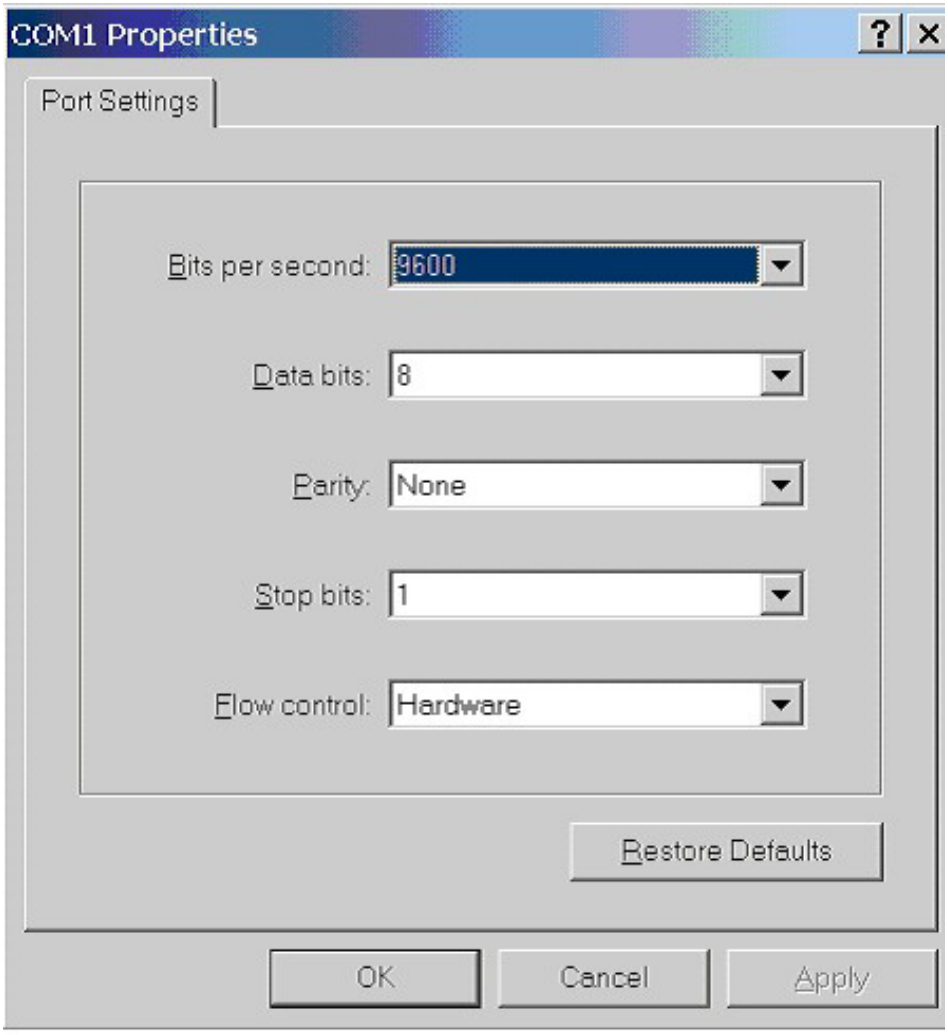
2. Access connection settings from the HyperTerminal main screen by selecting the **File** menu, and then clicking **Properties**.

3. On the Connect To tab, click **Configure** to display the Port Settings tab.



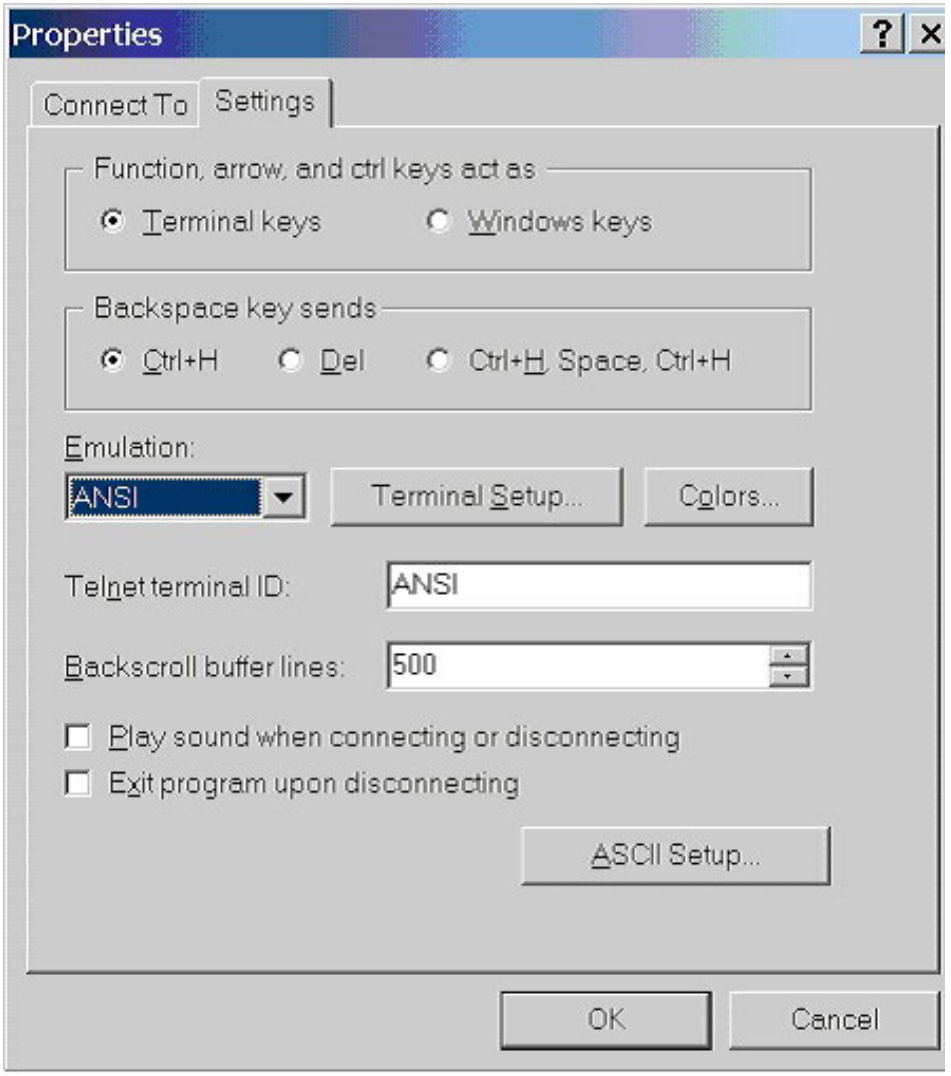
NOTE: If using a notebook computer, the Connect using field should be set to COM1 or COM2, depending on your configuration. COM1 is the HP default setting.

4. Select **Port Settings**. Then click **OK** to return to the Properties screen.



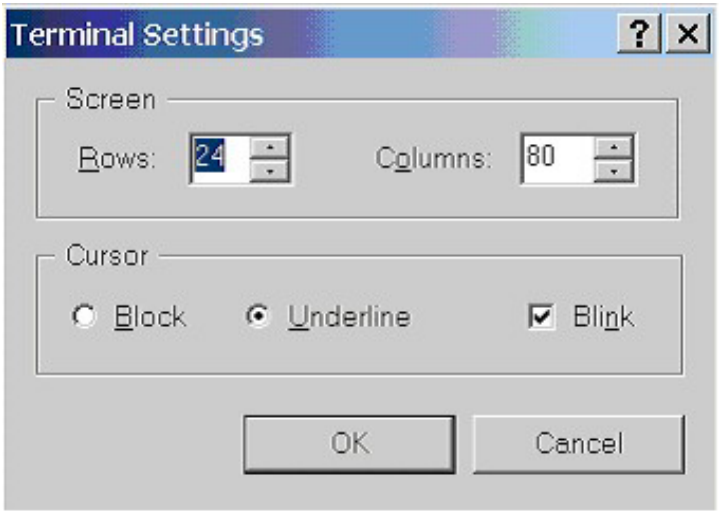
5. On the Properties screen, click the **Settings** tab.

6. If using ANSI emulation, click **Terminal Setup** and select **ANSI** (if using VT100 emulation, refer to step 9). ANSI is the default setting.



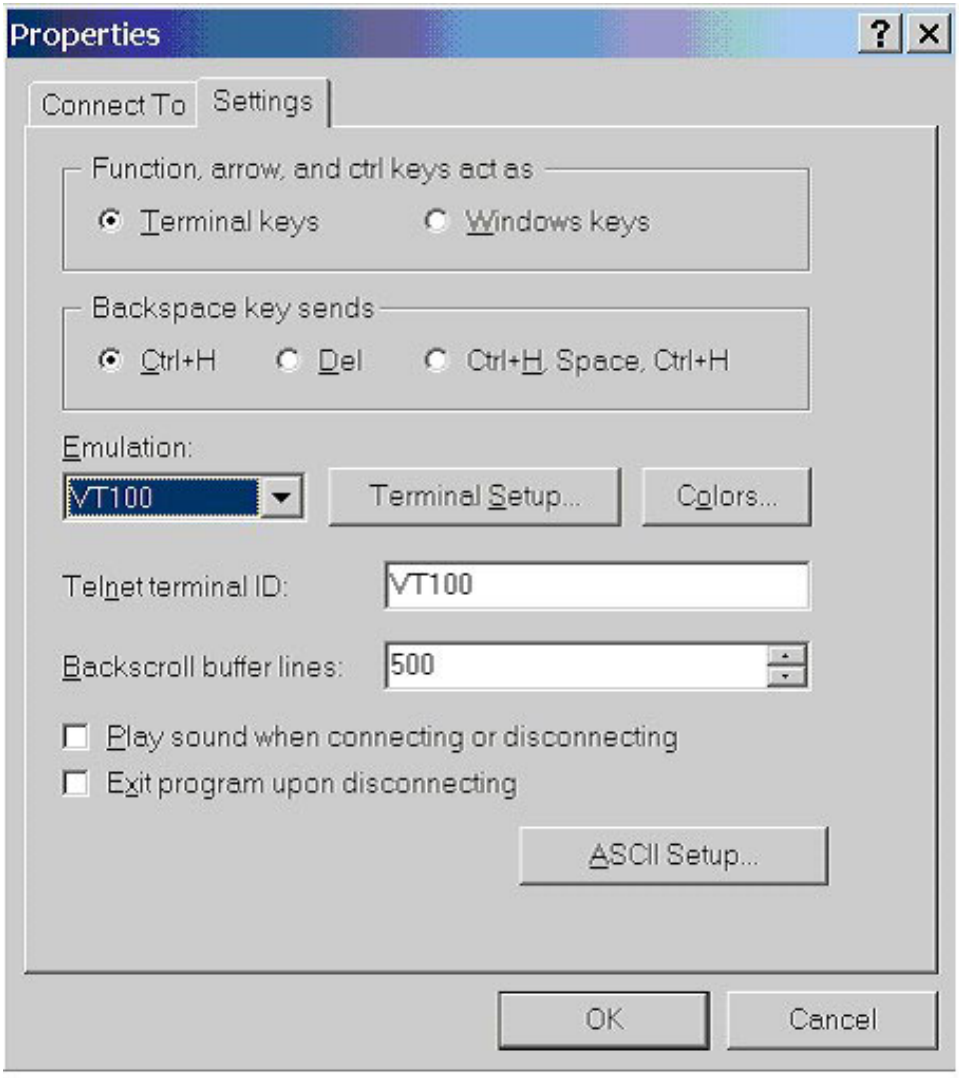
IMPORTANT: Both the remote and local machines must be set to the same emulation.

7. Select **Terminal Settings**.



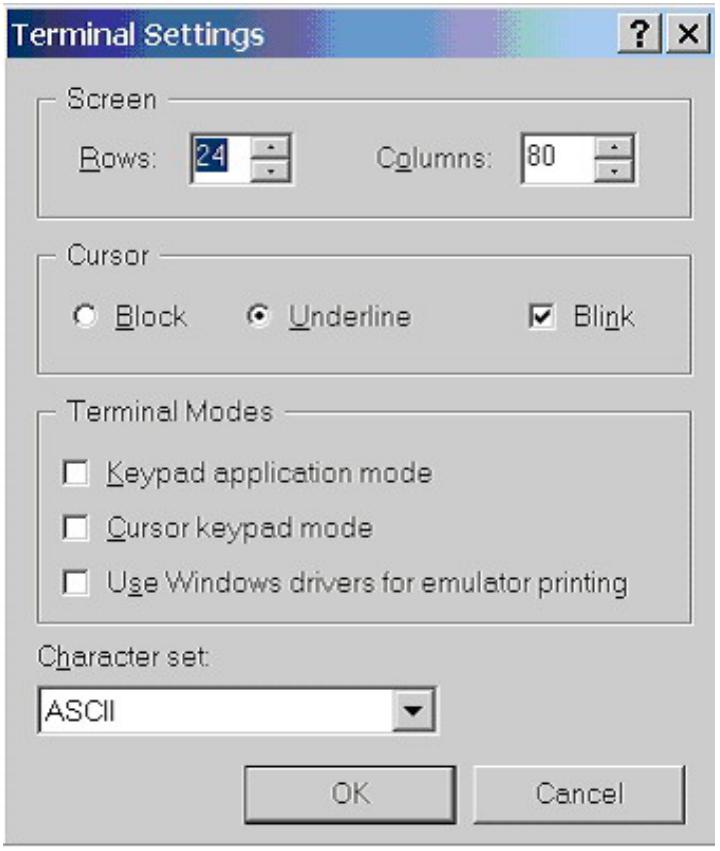
8. Click **OK** to return to the Settings tab, and click **OK** again to complete the HyperTerminal setup process.

9. If using VT100 emulation, click **Terminal Setup** and select **VT100**.



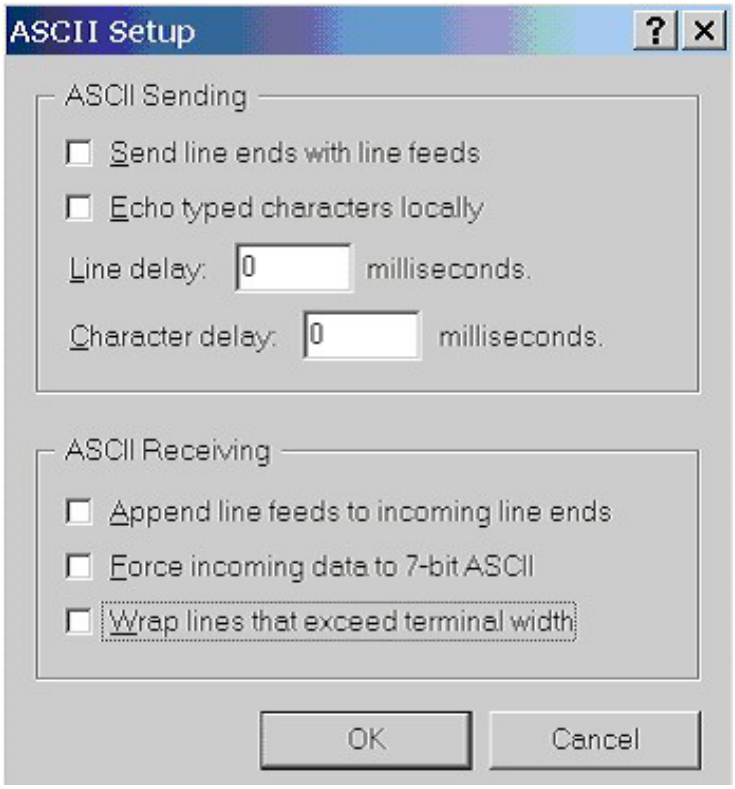
IMPORTANT: If using VT100 emulation, the setting must be changed from the default ANSI setting in RBSU.

10. Select **Terminal Settings**. Click **OK** to return to the Settings tab.



11. On the Settings tab, click **ASCII Setup**.

12. Deselect **Wrap lines that exceed terminal width**. Click **OK** to return to the Settings tab. Then click **OK** to complete the HyperTerminal setup process.



Acronyms and Abbreviations

ASR

Automatic Server Recovery

CLI

Command Line Interface

ConRep

Configuration Replication Utility

ECC

error checking and correcting

EMS

Emergency Management Services

IDE

integrated device electronics

iLO

Integrated Lights-Out

IMD

Integrated Management Display

IPL

initial program load

IRQ

interrupt request

MPS

multi-processor specification

NIC

network interface controller

NMI

non-maskable interrupt

ORCA

Option ROM Configuration for Arrays

PCI

peripheral component interface

POST

Power-On Self-Test

PXE

preboot eXecution environment

RBSU

ROM-Based Setup Utility

RILOE

Remote Insight Lights-Out Edition

RILOE II

Remote Insight Lights-Out Edition II

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